

WOODWARD (J.H.)

EYE-STRAIN  
AND  
FUNCTIONAL NERVOUS DISEASES.

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# EYE-STRAIN AND FUNCTIONAL NERVOUS DISEASES.\*

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MR. PRESIDENT—GENTLEMEN :—

I have chosen to speak to you of Eye-Strain and Functional Nervous Diseases, because the discussion will take us into the field of practice in which the general practitioner and the ophthalmologist have common interests. We are both engaged in the attempt to relieve the same class of patients. You have no doubt seen in medical literature extending over the past four or five years, many references to this particular subject, and you will no doubt remember that the discussion of it has been animated and extremely acrimonious. The most noteworthy contributions to it have come from the pen of Dr. George T. Stevens, of New York, who was the first to direct attention to its importance, and who has done more than any other investigator in this department to advance our knowledge. During the past four years, I have devoted considerable time to the study of eye-strain and its effects on the general system, and I desire to lay before you now the first preliminary report of the results of my observations.

In the first place, you will ask, what is eye-strain ? What does the term signify ?

In the normal state, distinct vision is obtained by a minimum expenditure of nervous energy. The visual apparatus, in the normal state, is represented by the emmetropic eye, and by properly balanced ocular muscles. In the emmetropic eye, parallel rays of light, or rays reflected by distant objects, are brought to a focus on the retina, *while the eye is at perfect rest* ; and divergent rays of light, or rays reflected by near objects, are brought to a focus on the retina by virtue of the contraction of the ciliary muscle, involving a minimum expenditure of nervous energy. At the same time, distinct binocular vision is secured by the consentaneous and involuntary contraction of the ocular muscles. Under these circumstances, the function of sight is performed without annoyance or discomfort. But there are instances of deviation from the normal, some of which go to make up the condition known as eye-strain. Now, Eye-Strain may be said to exist whenever, in the attempt to obtain distinct vision, there is an expenditure of nervous energy in excess of the normal. Accepting this general definition as true, we find that eye-strain may be the product of a variety of causes : (1) It may be due to an error of refraction ; (2) to some fault in the ocular muscles ; or (3) to a combination of an error of refraction and a fault in the ocular muscles.

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## EYE-STRAIN FROM AN ERROR OF REFRACTION.

Of all the errors of refraction, Hypermetropia is by far the most common. The hypermetropic eye is too short in its antero-posterior diameter ; consequently parallel rays of light are not, *when the eye is at rest*, brought to a focus on the retina, but behind it. Patients possessed of such eyes usually have normal vision. Often their vision is extremely acute, but this acuteness of sight is obtained by an excessive expenditure of nervous energy through the contraction of the ciliary muscle, which is always necessary to give the hypermetrope normal vision. Now it is unquestionably true that every eye, whether it has an error of refraction or not, is always endeavoring to secure distinct vision, no matter what the effort may cost ; so that in hypermetropia the patient is always in a condition of eye-strain.

Another common error of refraction is Astigmatism. The two common varieties are the Hypermetropic and the Myopic. When we speak of Hypermetropic Astigmatism, we mean that the radius of curvature of the cornea is normal in one meridian and too long in the opposite. Such an eye, looking at the arms of a cross, may see the shaft distinctly, but the arms are blurred. It is astigmatic in one meridian. In one meridian the rays of light are brought to a focus on the retina, and in the other they are brought to a focus behind it. A similar condition prevails in Myopic Astigmatism. The radius of curvature is normal in one meridian and too short in the other and the rays of light are brought to a focus accordingly. In one meridian the image is distinct, in the other it is indistinct. Besides these simple varieties of astigmatism, we find compound varieties. We find Hypermetropia with Hypermetropic Astigmatism, and Myopia with Myopic Astigmatism, and we occasionally see examples of mixed and of irregular astigmatism. When you reflect upon the fact that every one instinctively attempts to secure perfectly distinct vision, you are in a position to appreciate the struggle of one of these astigmatic patients. He must contract the ciliary muscles irregularly in order to secure sharply defined retinal images, so that a patient having astigmatism is always in a condition of eye-strain dependent upon his error of refraction.

There is another error of refraction known as Myopia, or short sight. That error is not so commonly attended with eye-strain as the other forms that I have mentioned. The patient cannot make any effort of the muscle of accommodation that will give him distinct distant vision. Eye-strain, in these cases, arises from the fact that the image is blurred, and the patient is always endeavoring to determine what the blurred image means.

Finally, we find Presbyopia. This is an acquired state. It is a fault in the accommodation. The accommodation is normal up to forty, and then begins to fail. The condition of Presbyopia is developed as a fault of the accommodation, by virtue of the diminished elasticity of the crystalline lens ; and most patients, after 40 years of age, unless provided with correcting glasses, must compensate their presbyopia by an excessive contraction of the ciliary muscle.

## EYE-STRAIN DUE TO SOME FAULT OF THE OCULAR MUSCLES.

While it is unquestionably true that there is a strong instinctive impulse to secure distinct retinal images, it is equally true that there is an instinctive impulse quite as strong to secure distinct binocular vision. Diplopia is avoided at almost any cost. Indeed, the abhorrence of it is so great, that in strabismus, even when the vision is 20-20 in each eye, we not unfrequently see patients who persistently fail to observe with both eyes at the same instant. This will not seem very strange to any one who has seen a case of diplopia. Patients suffering with it seem to have lost the proper sense of contact with the external world, and their very existence depends upon the suppression of the false image and the re-establishment of single vision. The ocular muscles, in the normal state, secure to the patient binocular vision without fatigue. These muscles, however, are often found in abnormal states. They may be weak, or they may have a faulty tension; and both weakness and faulty tension of the ocular muscles are common causes of eye-strain.

When a patient whose internal recti muscles are weak, attempts to see distinctly either a distant or a near object, he can do so only by an excessive expenditure of nervous energy. The muscular weakness is compensated by an excess of nervous impulse to the weak muscles. For instance, a patient is afflicted with headache, nervousness and insomnia. The general practitioner can find no cause for the trouble. There is no affection of the stomach. In short, none of the organs are diseased. The patient goes to an oculist who discovers an error of refraction, and glasses are prescribed. The patient is sent away in the hope that the headache, the pain in the back of the neck, and the insomnia will be relieved and that his general health will be much better. He returns to his work, but the headache still continues, he still suffers with insomnia. His general condition is very little better than at first. Discouraged, he gives up his work, and goes to the country. After several weeks he returns, eats well, sleeps well, is well—apparently. But in a few weeks he breaks down again with the same symptoms as before. Then he goes again to the oculist, and a weakness of the muscles of the eye is detected. Exercise of the muscles by means of prisms is begun, and the patient's condition improves as the muscles grow stronger. The pain in the back of the neck disappears, the headaches are gone, and the insomnia is cured; and this treatment has been carried out while the patient is attending to his regular business. When the ocular muscles are restored to their normal strength, the patient is cured, and perhaps remains well for the remainder of his life.

## FAULT IN THE TENSION OF THE MUSCLES.

Eye-strain may be a consequence of faulty tension of the ocular muscles. This faulty tension in the ocular muscles may manifest itself in a tendency to the crossing of the visual lines, or to a divergence of the visual lines, or in a tendency of one visual line to rise above the other. We are indebted to Dr.



Stevens for a series of terms which exactly define these conditions. For instance, in Orthophoria the ocular muscles are in a state of equilibrium. In Heterophoria, there is some fault in the tension of the ocular muscles. By Esophoria, we understand a tendency of the visual lines to cross. In Exophoria, there is a tendency of the visual lines to diverge. There is, moreover, a condition known as Hyperphoria, in which the tendency of the visual lines is to rise the one above the other. Now you may appreciate the state of things that would exist in Hyperphoria, for instance, by supposing that the visual line of my right eye tends to rise above the visual line of the left. There is a tendency then to double vision, and in order that the vision may be single and distinct, I must throw an excessive amount of nervous energy into the antagonistic muscle to bring the eyes to a level. You can imagine how difficult such a thing would be to accomplish, especially in reading; for, in addition to the necessary convergence, I must throw an abnormal impulse into the inferior rectus. This condition is often the cause of headaches and other nervous disturbances.

#### RELATION OF EYE-STRAIN TO FUNCTIONAL NERVOUS DISEASES.

Having now shown how eye-strain may cause a waste of nervous energy, I will proceed to point out the relationship that exists between it and functional nervous diseases. At the outset, however, permit me to call your attention to the fact that eye-strain may exist without any apparent injury to the patient. But, although the condition may not at present give rise to any trouble, it is, nevertheless, a constant menace to the vigor of his health; and the only reason to be assigned for the immunity which he enjoys, is that his system is strong enough to furnish more energy than is required to perform the functions of the normal man.

By functional nervous diseases, we mean those disturbances of the health in which no special anatomical lesion is found in the organ affected. They have no pathology. At least modern investigation has not discovered any pathological changes to account for many of the cases. In this category, are classed most cases of headache, neuralgia, neurasthenia, chorea, hysteria, epilepsy and insanity. Neurasthenia is nervous exhaustion. Chorea, hysteria, epilepsy and insanity are all states of perverted function. Headache and neuralgia are observed when the nerve tissue is congested or hyperæmic, when it is anæmic or when it is poisoned by the taint of syphilis or malaria. All these conditions are associated with some change in the nerve tissue which manifests itself in perverted function, that is, in this instance, pain. Of course it will not be denied that syphilis and malaria are commonly the efficient cause of this change in the nerve tissue. Nor would I hesitate to admit that congestion, hyperæmia and anæmia do cause pain. But we may seriously doubt, I think, that those conditions are frequently the efficient cause of headache and neuralgia. There may be engorgement of the blood-vessels of the painful tissue during the paroxysm, but it is quite as likely that it is an associated phenomenon as that it is the cause of the pain. I hesitate less in stating this proposition because the medical treatment of hyperæmic and congestive headaches and neuralgias is not satisfactory. The numerous remedies suggested may mitigate the severity of the attack, but they are not very efficient in preventing further

attacks. They do not eradicate the underlying evil. Moreover, the very multiplicity of remedial agents for a given malady invariably indicates that the medicinal treatment of it is, to say the least, not understood. But such cases frequently yield to treatment directed to the relief of eye-strain. Recurrence of the attacks is prevented, and the patient is cured. Indeed, among oculists it is not an uncommon experience to relieve in this way cases of congestive, hyperæmic and anæmic headaches, which have been through the hands of a dozen or more physicians without receiving any special benefit.

The system can supply a certain amount of energy, and no more. There is a limit to its powers in this direction ; so that when there is an excessive waste of nervous energy, and the normal requirements of the system can no longer be met, the patient will suffer from some functional disturbance of one or more of the organs of the body. Oftentimes eye-strain causes such a waste of nervous energy, and consequently a functional disturbance of the system. Even the most conservative doctor will now admit that *occasionally* headache is due to some disturbance of sight, and less frequently will he acknowledge that neuralgia, especially of the cranial nerves, may be due to a similar disturbance. This acknowledgment has only been wrested from him by demonstrating over and over again that headache and neuralgia are often caused by the eyes. At present the controversy is waged over eye-strain as a cause of chorea, epilepsy and insanity. It is alleged by some that chorea is due either to a lesion of the heart or to the poison of rheumatism ; and a recent writer has attempted to establish the pathology of chorea by a detailed account of the post-mortem examination of a single case. But, strange to say, these gentlemen are loath to admit the possibility that chorea may be the consequence of a fault in the visual apparatus.

Perhaps the greatest controversy has been over epilepsy. I am free to admit that it may well seem strange to one who is not familiar with the effects of eye-strain, that epilepsy may be due to such a condition. Still, in view of the published cases of epilepsy which have been cured by treatment of the eyes, we are no longer justified in excluding eye-strain from the list of causes of this terrible malady. I cite from the writings of a well known neurologist\* a list of the causes of epilepsy which are admitted by him :—heredity, sex, traumatism, syphilis, prolonged lactation, intestinal worms, gall stones, fright, carious teeth, anæsthesia, concussion of the brain, uterine and ovarian diseases, toxic causes, gout, malaria, hepatic congestion, exanthemata, cerebral anæmia, preputial irritation, vesical calculus, masturbation, gastric disturbances, injury of nerves, neuromata, and affections of the ear.

This is certainly a liberal etiology, and it seems to me that one who is willing to admit that epilepsy may be due to all these causes, should not deny the probability that eye-strain is sometimes the efficient cause of that disease.

I have already consumed sufficient time in a preliminary discussion, and I will proceed to a citation of the evidence which I desire to present at this time. From my case books, I have extracted one hundred and fifty consecutive cases

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\* Pepper's System Medicine, V. 468.



of non-organic headache. The first case was under my observation four years ago. In 85% of these the treatment was successful. In sixteen cases the treatment failed. Among the failures may be classed those cases in which possibly I made an incorrect diagnosis, or failed to relieve the eye-strain. In the following table you will find a detailed account of each of these cases.

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## ONE HUNDRED AND FIFTY CONSECUTIVE CASES OF HEADACHE TREATED FOR THE RELIEF OF EYE-STRAIN.

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Result unknown in.....	28 cases.
Refused to, or could not, follow advice . . . . .	19 “
Failed in.....	16 “
Result known in.....	103 “
Success, about eighty-five per cent.	

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- Case 1. Emma C., 8 years; 1885. For three years has complained of pain in back of her head when tired. Says she cannot see work on blackboard at school. Has “nervous spells,” in which she has chills, is feverish, and delirious when drowsy. Heavy feeling in her head; says things look yellow. V. 20-20 in each eye. R., Simple hypermetropic astigmatism; L., hypermetropia. Correcting specs for constant use. Relieved.
- Case 2. Miss F. B., 1885. Asthenopia. Severe congestive headache at every monthly period. Ovarian dysmenorrhœa of severe grade. R. V., 20-20; L. V., 20-20. Simple hypermetropic astigmatism in each eye. Correcting glasses for reading. Asthenopia relieved. Headache not affected.
- Case 3. Mr. Q., 1885. Fracture of right ramus of lower jaw by kick of a horse. Was near-sighted prior to injury, and suffered from vertigo and headache after studying. Still has frequent attacks of headache and vertigo. R. V., fingers at 16 ft.; L. V., fingers at 16 ft. Myopia. Ordered partial correction. Relieved.
- Case 4. Miss A. S., 1885. Headache and lachrymation in right eye after reading. Has pelvic trouble, for which she is under treatment. V. 20-20 in each eye. Simple hypermetropic astigmatism. Correcting glasses for reading. Relieved.



- Case 5. Miss L. M., 1885. Headache through temples and top of head ; occasionally pain in back of neck. R. V., 20-30 ; L. V., 20-40. Simple myopic astigmatism. Prescribed specs for constant use. No result—advice not followed.
- Case 6. Mrs. C. D., 1885. Headaches and nausea after reading or sewing. Had the same symptoms four years ago, and was relieved by glasses ; but her glasses do not relieve her now. R. V., 20-20 ; L. V., 20-20. Simple hypermetropic astigmatism. Prescribed correcting glasses for near work. Relieved. Remained well till 1889 ; saw her July 25. ; anæmic ; has headaches and nausea, and dyspepsia. V. normal in each eye. Glasses are correct. Esoph. 1° ; exoph. in accom. 2° ; abduc 5° ; adduc 12°. Ordered Bland's pill and essence of pepsin, and exercise of ocular muscles. Much improved one month later.
- Case 7. Mrs. A. F. S., 1885. Headache nearly constant. Asthenopia and vertigo. R. V., 20-30 ; L. V., 20-30. Comp. hypermetropic astigmatism. Prescribed correcting glasses for constant use. Relieved, but uses specs chiefly for near work. 1887—headaches returning ; changed glasses. Relieved promptly.
- Case 8. Miss E. W., 1886. Headache in morning and after using eyes. V. 20-20 in each eye. No relief.
- Case 9. Prof. E. H. D., 1886. Severe and almost continuous headache across forehead, and pain through eyes. Asthenopia and tendency to convergent strabismus. V. 20-20 in each eye. Simple hypermetropic astigmatism. Prescribed correcting glasses for reading. Relieved. 1887—Blepharitis and some headache. Pagenstecher's ointment reduced, and advised constant use of specs. Relieved, and has remained well to date.
- Case 10. Miss E. M., 1886. Asthenopia and severe headaches. R. V., 20-50 ; L. V., 20-70. Comp. hypermetropic astigmatism. Prescribed correcting specs for constant use. Unknown.
- Case 11. Mrs. V., 1886. Headache ; asthenopia ; frequent nausea ; occasional diplopia ; epileptiform convulsions. R. V., 20-30 ; L. V., 20-40. Simple hypermetropic astigmatism. Prescribed correcting glasses. Unknown.
- Case 12. Mrs. T., 1886. Headache in vertex ; pain in back of neck and in and behind eye-balls. Vertigo. Pelvic trouble for which she is under treatment. R. V., 20-40 ; L. V., 20-30. Exact error not made out. No prescription—advised to come again. No result.
- Case 13. Miss C. B., 1886. Eight years ago had severe headache and “drawing sensation in eyes.” Relieved by glasses. 2½ years ago relapsed, and was relieved again in the same way ; has the same symptoms now. Comes from a very nervous family. R. V., 20-70 ; L. V., 20-70. Mixed astigmatism. Prescribed correcting specs. Relieved. 1889—Have seen her since suffering from headache, but she was anæmic as a consequence of domestic troubles and sickness. Relieved by rest and iron.

- Case 14. Miss C. D. P., 1886. Headaches; asthenopia. Presbyopia. Prescribed reading glasses. Unknown.
- Case 15. Miss E., 1885. Headaches and pain in eyes for many years. R. V., fingers at 20 ft.; L. V., fingers at 20 ft. Myopia; insufficiency of interni. Prescribed reading specs with pris. 2° base in. Tonic of iron, arsenic and mercury, and dil. phosphoric ac. 1886—Has not suffered from headache since she begun using the glasses. Has taken twelve ounces of tonic. Ordered distance specs. Has not reported since.
- Case 16. Mrs. L., 1886. Frequent headaches; is very nervous. Headaches worse after using eyes. Has pelvic trouble which seriously affects her general health. R. V., 20-50; L. V., 20-30. Simple hypermetropic astigmatism. Prescribed correcting specs for constant use. Unknown.
- Case 17. Miss L., 1885. Nearly constant headache; very severe at monthly period. Has pelvic trouble, which is under treatment. R. V., 20-40; L. V., 20-40. Comp. myopic astigmatism. Prescribed correcting specs for constant use. 1886—Headaches less severe; she prefers to use the specs. Pelvic trouble improved.
- Case 18. Mrs. R. W., 1885. Headache, nausea, nervousness, insomnia, and vertigo. Presbyopia and insufficiency of interni. Correcting specs with prism for near work. Unknown.
- Case 19. Mrs. G., 1886. Headache located in vertex and pain in back of neck for 2 years. Pain in eyes, feels that she must keep eyes closed. Every time she reads or sews has pain in top of head and back of neck. V. 20-20 in each eye. Simple hypermetropic astigmatism. Correcting specs. No relief; saw her but once, and could not use atropine.
- Case 20. Mrs. J. P., 1885. Headaches for years; pain begins on rising, and continues all day; frequent vertigo. Asthenopia. R. V., 20-20; L. V., 20-20. Simple hypermetropic astigmatism. Correcting specs. Partial relief. 1889—Saw her again; has headache, vertigo, pain in back of neck, dyspepsia, confused feelings in head; changed her glasses. Saw her a few times, and result unknown.
- Case 21. Mr. F. E. M., 1886. Considerable headache; sick-headache twice each week; frequent vertigo; occasional diplopia; duration of symptoms, 1 year. R. V., 20-20; L. V., 20-20. Simple hypermetropic astigmatism. Correcting specs for constant use. 1887—Headaches relieved; no diplopia, and tendency to squint troubles him but little. Glasses trouble: changed to comp. hypermetropic astig. in R, and increased strength of glass for L. Relieved.



- Case 22. Mr. H. H., 1886. Nearly constant headache ; dyspepsia, hypertrophic rhinitis. R. V., 20-20 ; L. V., 20-20. Simple hypermetropic astigmatism. Correcting specs for constant use, and treatment for his catarrh. No relief. 1887—Developed melancholia ; sister also insane. Glasses correct. Astig. orthophoria except adduc.=only  $18^{\circ}$ . Made only one examination. Recovered his mental strength after a few months.
- Case 23. Miss E. M., 1886. Nervous headaches once or twice each week. General health good. Pains in eyes. R. V., 20-70 ; L. V., 20-70. Hypermetropia. Correcting specs. No relief—two visits.
- Case 24. Mr. C. P., 1886. Occasional very severe headaches. Distant vision indistinct. R. V., 20-70 ; L. V., 20-70. Simple hypermetropic astigmatism. Prescribed correcting specs. Headaches relieved. 1889—Reports a return of headache, but has not been able to visit me again.
- Case 25. Mrs. M. S., 1886. Dull headache across forehead ; vertigo in the sunlight ; very nervous ; general health poor. R. V., 20-20 ; L. V., 20-20. R., comp. hypermetropic astigmatism ; L., Simple hypermetropic astigmatism. Correcting specs for constant use. 1887—Headache and vertigo cured by the specs. 1889—Broken down by domestic troubles. Neurasthenia, for which she has been under treatment by a specialist. Thinks her glasses need changing. Prescribed a change of right lens. L. Hyperph.  $\frac{3}{4}$  esoph. 2 in accom. ; 4 adduc. 20 ; abduc. 6.
- Case 26. Miss L. B., 1886. Frequent headache in vertex ; vertigo and occasional nausea. Asthenopia. R. V., 20-20 ; L. V., 20-20. Simple hypermetropic astigmatism. Correcting specs. Unknown.
- Case 27. Miss M. S. C., 1886. Frequent headache ; pain is located about eyes and in top of head ; occasional vertigo. R. V., 20-40 ; L. V., 20-40. Simple hypermetropic astigmatism. Correcting specs. Improved.
- Case 28. Miss N., 1886. Headaches due to use of eyes in studying. R. V., 20-20 ; L. V., 20-20. Simple myopic astigmatism. Correcting glasses for studying. Unknown.
- Case 29. Miss K. F., 1886. Very frequent headache ; sick-headache after every snow storm ; dyspepsia and resulting palpitation of heart. Homatropine. R. V., 20-30 ; L. V., 20-30. R., comp. H. As. ; L., simp. H. As. Correcting specs. Complete relief at once. She is a trained nurse, and at the time was attending a case of neurasthenia. 1888—While nursing a difficult case her headaches began to trouble her ; changed her specs, and was again relieved, and has remained well to date.
- Case 30. Miss B. G., 1886. Some headache ; asthenopia. V. 20-20 in each eye. Comp. hypermetropic astigmatism in each eye. Correcting glasses for reading. Unknown.

- Case 31. Miss W., 1887. Formerly suffered much with headaches, but was relieved by glasses. Pain in R. E. after reading; confused feeling in head; pressure across forehead; occasional vertigo; flashes of fire before both eyes, and is sometimes kept awake by it. R. V., 20-200; L. V., 20-20. R., comp. myopic astigmatism; L., simple myopic astigmatism. Correcting glasses. Relieved.
- Case 32. Miss B. S., 1887. Constant headache; pain in back of neck; confused feeling in head. Atropine. R. V., 20-30; L. V., 20-30. Hypermetropia; s x 0.75 for each eye. Exophoria. Was given, contrary to my advice, s x 0.75 L. pris. 1° base out each eye. No relief. 1889—Constant headache; has worn the glasses to date; has tried a variety of treatment, but no result; confused feeling in head; is in poor health. Exoph. 4 in accom. 9; abduc. 9; adduc. 19. Advised Stevens' operation in ext. rectus tendon. Caused her to leave off her specs, with result of improving her condition. Refused operation.
- Case 33. Mrs. O., 1887, Feb. Headache, sometimes continuous for 2 or 3 weeks; sick-headaches; cannot read in evening without having a headache on the following day. R. V., 20-100; L. V., 20-20. R., mixed astigmatism; L., myopic astigmatism without atropine. Correcting lenses for constant use. May, 1887—Reports that she has not had one of her old sick-headaches since she began wearing the glasses. Dec., 1887—Enfeebled by domestic anxieties of serious nature. Dyspepsia. Advised her to go away for her health; has severe headache. 1888—Saw patient again, when she told me that her glasses had relieved her head very much.
- Case 34. Mrs. E. H. D., 1887. Frequent sick-headaches; eyes painful after using them. Vertigo. R. V., 30-30X; L. V., 20-30X. Comp. hypermetropic astigmatism in each eye. Correcting lenses. Relieved.
- Case 35. Miss W., 1887. Constant headache during past year; sick-headache once in 2 or 3 months; sight blurs when she reads. R. V. fingers at 20ft.; L. V. fingers at 20 ft. Myopia. S—6 D. V. 20-50; S—6 D. V. 20-50 ordered. Has been wearing much stronger lenses. Relieved.
- Case 36. Mrs. H. C. T., 1887. Headaches, formerly violent, but during the past year they have been less severe. R. V., 20-50; L. V., 20-50. R., simple hypermetropic astigmatism; L., simple myopic astigmatism. 1888—correcting lenses without atropine. Is relieved of headache and nervousness when she wears her glasses.
- Case 37. Mrs. H. W., 1887. Headaches brought on by riding in cars, on the water, or by reading. Pain is very severe, and continues from a few hours to several days. Has been treated by a number of physicians for a variety of troubles, but nothing has relieved her headaches. Is often compelled to go to bed with the pain, and has been obliged to give up excursions on the water, and rides as little on the cars as possible. R. V., 20-30; L. V.,



- 20-20. R., simple hypermetropic astig. ; L., comp. hypermetropic astig. Correcting glasses to be worn constantly for a few weeks, and then for reading and for distance when necessary. Relieved, and has remained free from headache up to date.
- Case 38. Mr. J., 1887. Frequent headache. R. V., 20-20 ; L. V., 20-20. Comp. hypermetropic astig. in each eye. Correcting glasses. Relieved.
- Case 39. Dr. M., 1887. Pain in back of head after reading. Asthenopia. R. V., 20-20 ; L. V., 20-20. Simple myopic astig. in each eye. Correcting glasses for reading. Unknown.
- Case 40. Mrs. L. G. B., 1887. Constant headache over both eyes. R. V., 20-20 ; L. V., 20-20. Refraction not determined ; did not use atropine. Prescribed by guess. No relief.
- Case 41. Miss J. M. F., 1887. Chronic headache. R. V., 20-20 ; L. V., 20-20. S. hypermetropic astig. in each eye. Correcting glasses. Unknown.
- Case 42. Miss E. A., 1887. Constant headache. Nervous spells at night ; awakens "trying to catch her breath." R. V., 15-200 ; L. V., 15-200. Myopia, with floating bodies in vitreous in both eyes. Advised to return for another examination, and advised her to change her occupation to work requiring less use of eyes. 1888—Has followed advice given as regards work ; has headache still, but less severe. Ordered S—2.50 for each eye as partial correction. Saw her several months later, when she reported relief from her headache ; she wished different glasses for reading.
- Case 43. Mr. P., 1887. Photographer ; complains of headache and inability to correctly focus his camera. R. V., 20-20. S. hypermetropic astig. in each eye. R., c-|-0.25 ax. 90 ; L., c-|-0.50 ax. 120. Relieved.
- Case 44. Mr. S. S. D., 1887. Complains of frequent headaches across forehead ; has post-nasal catarrh, which is not severe enough to cause headache. R. V., 20-20 ; L. V., 20-20. Presbyopia. Correcting glasses for desk work and for reading. Relieved.
- Case 45. Mrs. H. M. F., 1887. Frequent headache lasting from 2 to 4 days. Dyspepsia and chronic diarrhoea ; is very nervous. R. E. V., 20-70 ; L. E. V., 20-30. R., S. hypermetropic astig. ; L., comp. hypermetropic astigmatism. Correcting glasses. 1888—Less headache. Changed right lens. Final result unknown.
- Case 46. Mrs. R. H. B., 1887. Sick-headaches once in 2 or 3 weeks, is obliged to go to bed with them. Pain in eyeballs, temple and back of neck. R. V., 20-20 ; L. V., 20-30. R., comp. hypermetropic astigmatism ; L., hypermetropia. Correcting glasses. 1889—Reports relief from pain in eyes, and partial relief from sick-headaches. Saw her twice only, and did not use atropine.
- Case 47. Miss G. B., 1887. Frequent sick-headaches ; blind spells ; very nervous and hysterical. Comp. myopic astigmatism. Correcting glasses

Blind spells relieved ; no effect in headache or hysteria. Saw her once only, and could not use atropine.

- Case 48. Mr. J. H. G. 1887 Sick-headache all his life ; attacks occur every two weeks. ; blurring of sight precedes the attacks. R. V., 20-20 ; L. V., 20-20. R., simp. hypermetropic astig. ; L., comp. hypermetropic astig. Presbyopia. Correcting glasses for distance and for reading. 1888—Has not suffered from headache since he began using the glasses. 1889—Remains well so long as he wears the glasses sufficiently.
- Case 49. Miss E. S., 1887. Constant headache for one year. R. V., 20-20 ; L. V., 20-20. Is using c-|-0.50 a 40 for each eye ; exoph. 1 ; abduc 8 ; adduc. 10. Advised atropine. Did not return.
- Case 50. Miss E. H., 1887. Headaches following use of her eyes. R. V., 20-20 ; L. V., 20-20. Myopia. Correcting glasses. Relieved.
- Case 51. Mrs. W. J. H., 1887. Sick-headache once a month for one year. Asthenopia, R. V., 20-40 ; L. V., 20-40. Myopic astigmatism. Correcting glasses to be worn constantly. Advice not strictly followed ; used glasses chiefly for reading. Asthenopia relieved ; headaches not affected.
- Case 52. Mr. C. G. B., 1887. Sick-headache once a week. During the attack of headache is usually nauseated and sometimes vomits ; "Bilious temperament." R. V., 20-30 ; L. V., 20-70. Myopic astig. Correcting glasses, to be worn pretty constantly. Used the glasses chiefly for reading. Almost complete relief from headache.
- Case 53. Mr. L. W., 1887. Headache, pain chiefly in back of head. Dyspepsia and nausea. Astigmatism. Unknown.
- Case 54. Mrs. R. C. T., 1887. Five years ago was treated for severe and recurring headache, and by Dr. Stevens for relief of eye-strain. Remained well until 6 months ago, when the headache returned ; has considerable pain in back of her neck. R. V., 20-40 ; L. V., 20-40. Hypermetropic astig. Correcting lenses for constant use, without atropine ; patient suffering with a severe headache during examination. Feb. 1888—Reports relief from pain. Dec. 1888—Has headache whenever she reads or sews. Increased the strength of lens for R. E. Esoph  $2^{\circ}$  ; in accom.  $3^{\circ}$  ; abduc. 4 ; adduc  $10^{\circ}$ . Exercise of ocular muscles till adduc.  $20^{\circ}$ . Loaned prisms base out  $1^{\circ}$  each eye, for use, together with her cylindrical glasses, in reading and sewing. After a month's using, returned prisms and reported herself well, and has remained well to date.
- Case 55. J. D., 1888. Constant headache. Refractive error not ascertained, for patient could not read, and atropine was not used. Used a variety of medicinal treatment. No relief.



- Case 56. Mr. W. W. W., 1888. Headache through top of head twice each month ; occasional sick-headache ; very nervous ; insomnia ; indistinct distant vision. R. V., 20-200 ; L. V., 20-200. Myopia. Correcting glasses. Relieved.
- Case 57. Mrs. E. L. W., 1888. Headache ; pain located across forehead on top of head ; has had pain down back of her neck for past 6 months. Headaches follow using her eyes. Hypermetropic astig. and presbyopia. Correcting glasses. No report.
- Case 58. Mrs. S. C. S., 1888. Sick-headache very frequent ; very nervous ; asthenopia ; has pelvic trouble. R. V., 20-40 ; L. V., 20-20. R., comp. hypermetropic astig. L., hypermetropic astig. Without atropine. Correcting glasses for constant use. Seldom has headache, wears the glasses constantly. Almost complete relief.
- Case 59. Mrs. F. P., 1888. Pain in eyes and forehead, and neuralgic pains in back of neck. Asthenopia. R. V., 20-40 ; L. V., 20-50. Astigmatism. Correcting glasses. Partial relief.
- Case 60. Miss M. G., 1888. Headache and constant uncomfortable feeling in her head. Asthenopia. R. V., 20-30 ; L. V., 20-70. Myopic astig. Correcting glasses. Would not use the glasses. When atropine was recommended, she discontinued treatment.
- Case 61. Miss A. K., 1888. Very frequent headache, associated with nausea, obliged to go to bed with the pain, which is located in forehead and back of her neck. R. V., 20-30 ; L. V.,  $1\frac{1}{2}$ -200. R., hypermetropic astig. L., myopia. S.,—8 D. V., 20-150. Corrected the astigmatism in R. E. Relieved.
- Case 62. Mrs. B. D., 1889. Headache all her life ; dyspepsia ; has found no relief in medicine. R. V., 20-20 ; L. V., 20-20. Hypermetropic astig. in each eye. Presbyopia. Correcting specs for constant use. Would not wear the glasses. No relief from headache or dyspepsia.
- Case 63. Mrs. C. M. W., 1888. Severe headache ; asthenopia. Hypermetropic astig. in each eye. Corrected. No report.
- Case 64. Miss J. D., 1888. Nearly constant headache through temples, eyes, back of head and vertex. Occasional hemianopsia ; vertigo ; occasional diplopia ; nausea ; constant pain in back of neck and between shoulders. Constant pain in lower dorsal and lumbar regions, probably resulting from an injury. Has incurable ovarian trouble ; has also uterine and rectal disease. Is excessively nervous, but she is possessed of great energy, and is not disposed to give up to her numerous maladies. Has been thoroughly treated in a variety of ways for her various troubles, but nothing has relieved her head symptoms. R. V., 20-20 ; L. V., 20-20. Atropine. R. V., 20-200 ; L. V., 20-200. Jan. 22, 1888—Esoph. 4 ; abduc. 5. Jan. 25—Esoph. 7 ; abduc. 3 ; adduc. 20. Steven's op. right int. rectus. Patient very nervous,

and could not measure accurately the result of the operation. Jan. 31—Comp. hypermetropic astig. With correcting glasses, esoph. 2; without her glasses, esoph. 4. Correcting glasses for constant use.

October, 1889—Patient comes to consult me because when tired she sees her nose too much with her right eye. She is very much less nervous; seldom has headache, and only when tired, and then the pain is much less severe than formerly. Has no vertigo, no hemianopsia, no nausea, no pain in back of her neck and between shoulders; still has pain in lower dorsal and lumbar regions. She persists in attributing this great improvement in her condition to the treatment which I gave her eyes. She uses her glasses now chiefly for reading. Esophoria 2°; abduc. 8-6. Could see her but once, and gave her prisms for reading in addition to her specs.

- Case 65. Miss C. C., 1888. Headaches for more than a year, once or twice a week; pain located behind eyes, across forehead and in back of neck. Has been under general treatment without benefit. Her head grows worse; often dizzy in the morning. R. V., 20-20; L. V., 20-30. Hypermetropic astigmatism in each eye; esoph. 2; abduc. 10-12; adduc. 20. No report.
- Case 66. Miss K. B., 1888. Frequent headache; pain in forehead and temples every day. R. V., 20-70; L. V., 20-70. Myopia, Correcting glasses. No special relief reported.
- Case 67. Mrs. P. C. D., 1888. Headache frequent; pain in temples, eyes and in back of neck. Disagreeable feeling about left eye. R. V., 20-20; L. V., 20-20. Rejects all glasses. April 12—L., hyperphoria 1°; exoph. 8; abduc. 12; adduc. 10. April 13—L., hyperph. 2°; esoph. 10; abduc. 10; adduc. 15. April 20—L., hyperph. 1°--; exoph. 12°; abduc. 10; adduc. 18. April 22—L., hyperph. 1°; exoph. 11°; abduc. 14; adduc. 18. Advised correcting heterophoria by graduated tenotomy and exercise of ocular muscles. Refused treatment proposed: "Nobody should put her eyes out by an operation." No relief.
- Case 68. Mr. C. P. W., 1888. Headaches and asthenopia. R. V., 20-20; L. V., 20-20. Hypermetropic astigmatism. Homonymous diplopia with red glass; corrected by prism 10°. Correcting lenses for astigmatism. Proposed Stevens' op., which was refused for the present. To return if specs do not relieve him. Did not return. No relief.
- Case 69. Miss C. S., 1888. Nearly constant headache, which is especially severe when she uses her eyes for near work; is very nervous. R. V., 20-20; L. V., 20-20. Hypermetropic astigmatism in each eye. R., hyperphoria,  $\frac{1}{2}$ ; esophoria,  $\frac{1}{2}$ ; abduc. 7; adduc. 8. Corrected manifest astig. Advised exercise of ocular muscles. Headaches and nervousness relieved when she wears the specs, but she relapses when she attempts to go without them. Have seen her but once.

- Case 70. Miss R. C., 1888. Headaches. R. V., 20-30; L. V., 20-20. Myopia. Correcting glasses. Headache cured by wearing the specs a short time. No relapse.
- Case 71. Mrs. W. H., 1888. Headache twice each month, especially in vertex. Uncomfortable feeling in both eyes daily; nervous; asthenopia. R. V., 20-20; L. V., 20-20. Comp. hypermetropic astig. in each eye. Correcting glasses. Result unknown.
- Case 72. Miss M. S., 1888. Cannot sew or read without headache. R. V., 20-20; L. V., 20-30. Hypermetropia. Correcting glasses. Relieved.
- Case 73. Mrs. W. L. A., 1888. Asthenopia. Headache in left temple; pain in back of neck; very nervous at times. Astigmatism. Correcting glasses without atropine. No relief.
- Case 74. Mr. H. P. C., 1888. Headache after reading; obliged to give up school; parents feared his mind would become affected. R. V., 20-20; L. V., 20-20. Hypermetropic astig. in R.; comp. hypermetropic astig. in L. Orthophoria. Correcting glasses. Unknown.
- Case 75. Miss M. A. H., 1888. Frequent headache; pain in back of neck; tired feeling in eyes; very nervous. R. V., 20-20; L. V., 20-20. Myopic astig. Correcting glasses. Relieved when she wears her glasses.
- Case 76. Miss M. C. N., 1888. Headaches daily; very nervous when she studies or reads; goitre, and rapid heart's action. R. V., 20-30; L. V., 20-30. Hypermetropia; exophoria. Correcting glasses, and Stevens' op. left int. rectus. Relieved.
- Case 77. Miss S. S., 1888. Cannot sew without severe headache. R. V., 20-20; L. V., 20-20. R., comp. hypermetropic astig. L., hypermetropic astig. Correcting glasses. Unknown.
- Case 78. Mr. W. H., 1888. Frequent headache during the past 3 months; very severe pains in back of head. R. V., 20-20; L. V., 20-30. Hypermetropic astigmatism. Correcting glasses for near work. Relieved.
- Case 79. Mrs. J. H. L., 1888. Frequent headache. R. V., 20-20; L. V., 20-20. Co. myopic astig. in both eyes. Correcting glasses, for constant wear. Patient would not wear glasses. No relief.
- Case 80. Mrs. C. S. C., 1888. Frequent headache upon reading or sewing; pain in eyes; dyspepsia and nervous chills; very nervous at times. R. V., 15-200; L. V., 20-200. Myopia. Correcting glasses for constant use. Relieved.
- Case 81. Miss M. S., 1888. Constant general headache. R. V., 20-200; L. V., 20-200. Myopia. Correcting glasses. Fellow's Syr. hypophosph. Co., and rest from work. Treatment of eyes produces no effect on headache.



- Case 82. Mr. H. E., 1888. "Bilious" headaches once a week ; wears -|- glasses constantly. R. V., 20-40 ; L. V., 20-100. Hypermetropia and presbyopia. Glasses for reading. 1889—Saw patient ; he is wearing the reading glasses for general use ! headaches not relieved.
- Case 83. Miss A. F., 1888. Daily headache for three years, located in forehead, vertex and back of neck ; has pain in eyes, and blind spells ; ulcer of stomach, for which she was treated in M. F. H. R. V., 20-30 ; L. V., 20-30. Hypermetropic astigmatism. Correcting glasses for constant use. Headache much relieved. Occasionally after reading too much, she has headache.
- Case 84. Miss B., 1888. Headache nearly constant, sometimes violent ; dysmenorrhœa. R. V., 20-40 ; L. V., 20-40. Comp. myopic astig. in each eye. Correcting glasses. Unknown.
- Case 85. Mrs. R. A. W., 1888. Frequent headache, sometimes violent ; pain is located in forehead, vertex and back of neck. R. V., 20-20 ; L. V., 20-20. Hypermetropic astigmatism. Correcting glasses. No special effect.
- Case 86. Mrs. W. B. McK., 1888. Migraine. R. V., 20-70 ; L. V., 20-70. Comp. myopic astigmatism. Correcting glasses. Relieved until recently. For the relapse there is sufficient cause.
- Case 87. Mrs. A. A. B., 1888. Headache through forehead and top of head. Pain in back of neck and eyes ; brought on by riding and by near work. R. V., 20-70 ; L. V., 20-70. Myopic astig. Correcting glasses. Atropine not used. No relief.
- Case 88. Miss S. C. T., 1888. Chronic headache once or twice each week for a number of years. R. V., 8-200 ; L. V., 8-200. R., S-7 D. V., 20-70. L., S-7 D. V., 20-70. Prescribed such glasses. Unknown.
- Case 89. Miss M. E. W., 1888. Headache after using her eyes ; occasional sick-headaches. R. V., 5-200 ; L. V., 20-100. R., comp. myopic astig. L., myopia. Correcting glasses. Relieved.
- Case 90. Miss H. H., 1888. Headache ; pain in eyes. R. V., 20-20 ; L. V., 20-20. Hypermetropia. Correcting glasses. Relieved.
- Case 91. Mr. J. W. B., 1888. Headache for 25 years ; occasional sick-headache ; dyspepsia 20 years. R. V., 20-20 ; L. V., 20-20. Hypermetropic astig. Correcting glasses. Unknown.
- Case 92. Miss K. S. B., 1888. Headache for 5 years ; asthenopia ; anæmia. pelvic trouble. No relief from treatment of eyes.
- Case 93. Miss A. G., 1888. Frequent headache in top of head ; pain in eyes, sometimes obliged to go to bed with headache ; once in two months has sick-headache. R. V., 20-20 ; L. V., 20-40. R., hypermetropia. L., comp. hypermetropic astigmatism. Correcting glasses. Relieved.

- Case 94. Mrs. S. S. B., 1888. Headaches for years; pain in back of neck and spine; very nervous. R. V., 20-20; L. V., 20-20. Hypermetropic astigmatism. Presbyopia. Heterophoria. Corrected presbyopia, and tried prisms. Treatment not satisfactorily carried out, owing to unavoidable circumstances. No special relief.
- Case 95. Mrs. W. R., 1888. Headaches; asthenopia; is car-sick. R. V., 20-20; L. V., 20-20. Comp. myopic astig. Correcting glasses without atropine. Unknown.
- Case 96. Mrs. J. R. K., 1888. Headache; asthenopia. R. V., 20-20; L. V., 20-20. Hypermetropia. Correcting glasses. Relieved. 1889—Increased strength of glasses for headaches, on returning. Returned again, October, 1889—atropine.
- Case 97. Miss F. C., 1888. Constant headache; chlorosis. R. V., 20-20; L. V., 20-20. Atropine, R. V., 20-70; L. V., 20-70. Hypermetropic astigmatism. Correcting glasses. Slight if any relief from glasses, but patient wears them to date.
- Case 98. Mrs. D. L. R., 1888. Sick-headache for several years, after riding out. R. V., 20-20; L. V., 20-20. Hypermetropic astig. Correcting glasses. Relieved.
- Case 99. Miss N. D. M., 1888. Nearly constant headache for 3 years, especially after using her eyes. R. V., 20-30; L. V., 20-30. Refraction not made out, could not spare time for atropine. No relief.
- Case 100. Miss K. L., 1888. Headaches; frequent sick-headache; pains in back of her neck; pain in eyes; is very nervous. R. V., 20-20; L. V., 20-20. R., hypermetropia. L., hypermetropic astig. Correcting glasses for constant use. Later, exercise of ocular muscles. Relieved.
- Case 101. Mr. F. S. P., 1888. Some headache; occasional sick-headache. R. V., 20-40; L. V., 20-30. Myopic astigmatism. Heterophoria. Correcting glasses for reading, and prism exercise and electricity. Partial relief.
- Case 102. Mr. W. A. H., 1888. Headache across forehead after using his eyes. Hypertrophic nasal catarrh. R. V., 20-20; L. V., 20-30. Hypermetropic astigmatism. Correcting glasses for reading. Borax solution for nose wash. Relieved.
- Case 103. Miss H. W., 1888. Nervous headaches for years; formerly had sick-headaches; no relief from medicinal treatment; very nervous; has pain under her shoulder blades. R. V., 20-20; L. V., 20-20. Hypermetropic astigmatism; weak convergence. Correcting glasses. Unknown.
- Case 104. Miss B. W. H., 1888. Indistinct vision. R. V., 20-30; L. V., 20-70. R., myopic astigmatism; L., compound myopic astigmatism. Correcting glasses. April, 1889—Severe pain in head and back of neck; easily

put out of breath ; anæmic ; very nervous. Exoph.  $2^{\circ}$  in accom.  $4^{\circ}$  ; abduc. 8 ; adduc. 10. Prism exercises and electricity to int. recti.

April 26—Headache relieved. May 2—Much improved already. May 14—Exoph.  $\frac{1}{2}$  in accom. 2—3 ; abduc. 8 ; adduc. 28. Ordered Bland's iron. May 23—adduc. 34. May 30—Exoph. in accom. 6 ; abduc. 8 ; adduc. 36.

Next visit, June 25. Has symptoms of rose cold ; eyes have not troubled her since last visit. Discontinued treatment because she is so well.

- Case 105. Mrs. W. P. T., 1888. Headaches and asthenopia. R. V., 20-20 ; L. V., 20-20. Hypermetropic astigmatism. Correcting glasses. Relieved.
- Case 106. Miss N. S., 1888. Nearly constant headache since she injured her coccyx by falling while skating. Cannot see work on blackboard at school. R. V., 20-20 ; L. V., 20-40. Myopic astigmatism. Correcting glasses. Relieved.
- Case 107. Miss N. M. G., 1888. Headaches and photophobia. R. V., 20-20 ; L. V., 20-20. Comp. hypermetropic astigmatism. Correcting glasses. Unknown.
- Case 108. Miss L. D., 1888. Constant headache ; not relieved by medicinal or gynaecological treatment. R. V., 20-40 ; L. V., 20-40. Hypermetropic astigmatism. Correcting glasses. Relieved.
- Case 109. Mr. C. D. E. R. Headaches and asthenopia. R. V., 20-20 ; L. V., 20-30-40. Hypermetropic astigmatism. Correcting glasses. Advice not followed.
- Case 110. Mrs. F. R., 1888. Sick-headache after riding ; takes Bromide when she thinks the headaches are coming on ; cannot sew in evening ; one eye turns out occasionally. R. V., 20-30 ; L. V., 20-40. Myopic astigmatism. Exophoria  $5^{\circ}$ . Correcting glasses ; advised operation if not relieved by glasses. Unknown.
- Case 111. Mrs. C. H. M., 1888. Headaches after using her eyes. R. V., 20-30 ; L. V., 20-30. Myopic astigmatism. Correcting glasses. Relieved.
- Case 112. Mr. J., 1888. Headache nearly constant since last spring. R. V., 20-30 ; L. V., 20-30. Hypermetropic astigmatism. Is using glasses which partially correct the error. Relieved.
- Case 113. Miss L. P., 1888. Has always suffered from pain in eyes and forehead. R. V., 20-20 ; L. V., 20-20. Hypermetropia. Advised rest. Unknown.
- Case 114. Miss K. R., 1888. Severe and nearly constant headache ; blepharadenitis and conjunctivitis. R. V., 20-70 ; L. V., 20-70. Myopic astigmatism. Correcting glasses. Relieved.



Case 115. Gertrude P., 1889. 12 years old. When 4 years old eyes became crossed. 1887 Dr. Agnew prescribed convex glasses, and strabismus was relieved. In 1887 weaker glasses were prescribed, and eyes became crossed again. When I saw her she had well marked internal strabismus, but there was no diplopia. She suffered from severe headaches. Atropine. R. V., 6--200; L. V., 10--200. Hypermetropia. R., S--4 V. 20--70; L., S--2 V. 20--30. Tenotomy of right internal rectus, which corrected the strabismus. Glasses, R., S--3 D; L., S--1 D, for constant use. Eyes straightened; headaches relieved.

Case 116. Miss N. G., 1889. Headaches over eyes and back of head; pain about eyes. R. V., 20--30; L. V., 20--30. Hypermetropia; esoph. in accom. 6; abduc. 12; adduc. 12. Correcting glasses for H. M. Advised correction of heterophoria. No relief; did not follow advice.

Case 117. Miss A. F., 1889. Constant headache and pain in eyes when she attempts to read. Anæmic; palpitation of heart on slight exercise; choreic movements of her shoulders well marked; sleep is troubled; has received a variety of treatment without benefit. R. V., 20--20; L. V., 20--30. Atropine, R. V., 20--20; L. V., 20--30. Atropine, R., C--0.25 a. 90 V. 20--20 L., S.--0.50 V. 20--20. Esoph. 9 in accom. 12; after exercise; homonymous diplopia with red glass. Stevens' op. on left int. rectus; immediate result; esophoria 2°; abduc 6°; one month later, exoph. 5; in accom. 12; abduc. 4. R. V., 20--20; L. V., 20--20. Stevens' operation on right int. rectus; immediate result; esoph. 0; in accom. 0; esoph. 0; in accom. 0; abduc 8; one month later—no choreic movements; no constant headache; is more cheerful and feels that a weight has been lifted from her, but she has a headache about once a week. Discontinued use of glasses altogether; not so short of breath as formerly; has taken no tonic or other medicine; R. V., 20--20 -- L. V., 20--20 --. Is more ambitious, and can read without pain. Has some dyspepsia and rheumatism in feet, to both of which she is subject. Esophoria 0; in accom. 6; abduc 7; adduc 39. June 25 --Esoph. 1; in accom. 0; adduc. 32. Still some palpitation of heart; has some headache still; some days feels perfectly well; has no jerking, ("choreic movement,") less nervous, sleeps well; ordered Bland's iron pills grs 3 t.i.d. ordered electricity for int. rectus. Sept. 12—Took 100 Bland's pills as ordered; has but little headache; seldom has palpitation; some pain through eyes and forehead. Esoph. 0; in accom. 5; abduc 6-7; adduc 44. R. V., 20--20; L., 20--20. Ordered pris. 3° base out for reading; ordered Tab. trit. of iron, arsenic and ignatia, but she could not take them, and they were discontinued after a few doses. Relieved.

Case 118. Miss E. M. A., 1889. Headaches and asthenopia. R. V., 20--30; L. V., 20--40. Hypermetropia and granulated lids. Correcting glasses, and treatment for lids. Relieved.

- Case 119. Miss McK., 1889. Headaches and asthenopia. R. V., 20-20; L. V., 30-20. Atropine, R. V., 20-70; L. V., 20-70. Hypermetropic astigmatism. Correcting glasses. Relieved.
- Case 120. Mrs. F. E. S., 1889. Headaches nearly constant; very nervous; exhausted all the time; hysterical. R. V., 20-20; L. V., 20-20. Hypermetropic astigmatism. R., Hyperphoria  $1^{\circ}$ ; esophoria,  $4^{\circ}$ ; in accom.  $4^{\circ}$ ; abduc, 6; adduc, 18. Ordered correcting glasses, without atropine. No relief. Advised to come again; have not seen her since.
- Case 121. Mr. J. H., 1889. Frequent headaches and asthenopia. R. V., 20-20; L. V., 20-30. Hypermetropic astigmatism and blepharadenitis. Correcting glasses and yellow oxide ointment. Relieved.
- Case 122. Mrs. A. T. W., 1889. Headache after reading. R. V., 20-30; L. V., 20-50. Presbyopia and hypermetropic astigmatism. Correcting glasses for reading. Relieved.
- Case 123. Mrs. P., 1889. Headaches, confused feeling in head, and is very nervous; uterine trouble. R. V., 10-20. L. V., 20-20. Atropine, R. V., 20-50; L. V., 20-20. Hypermetropia. Correcting glasses for reading. No relief. Ocular muscles should have been strengthened, but treatment was not carried out.
- Case 124. Mr. O. R., 1889. Headaches and asthenopia. R. V., 20-20; L. V., 20-20. Hypermetropic astigmatism. Correcting glasses. Relieved.
- Case 125. Miss L. H. G., 1889. Headaches all her life; pain located over left eye and running down back of her neck. R. V., 20-20; L. V., 20-20. Presbyopia and hypermetropia. R., hyperphoria, 1-2; exophoria, 5; in accom. 8; abduc, 12; adduc. 36. Correcting glasses for reading. Advised graduated tenotomy. Refused operative interference. No relief.
- Case 126. Miss D. C., 1889. Headache and pain in back of her neck. Myopia, for which she is using correcting glasses. Hyperphoria, 0; exophoria 2; exophoria in accom. 4; abduc. 8; adduc. 18. Treatment was prism exercise for ocular muscles, electricity to int. recti, and occasionally the actual cautery to back of her neck. During the time she was hard at work at college. Relieved.
- Case 127. Miss G., 1889. Constant headache; asthenopia. R. V., 20-20; L. V., 20-20. Hypermetropic astigmatism; exophoria in accom. 2; abduc. 6; adduc. 10. Correcting glasses. Relieved.
- Case 128. Mrs. H. E. W., 1889. Headaches and asthenopia. R. V., 20-20; L. V., 20-20. Emmetropia without atropine. Exoph. 1; in accom. 9; abduc. 6; adduc. 8. Advised prism exercise for ocular muscles. No treatment.

- Case 129. Katie McC., 1889. 11 years old ; very severe headaches nearly every day ; is pale, and evidently in bad health ; is a bright, ambitious child ; impressed me that she would develop phthisis and die young ; examined lungs and found them normal. R. V., 20-50 ; L. V., 10-200. R. C. -- 2 at 90 V., 20-30. L., not improved by glasses. Ophthalmoscope shows irregular astigmatism. Correcting glasses ; rest from school ; cod liver oil, and exercise in open air. Seven months later saw her again ; came for prescription for her glasses which had been lost. Her appearance of good health was in striking contrast with her previous condition. Inquiry disclosed the fact that she had not followed my advice as regards rest from work and cod liver oil, and exercise in the open air. She had led her class, had studied all Summer, and had taken only a portion of one bottle of cod liver oil, and declared she would rather die than take the remainder. She had worn her glasses while at work, and had not had a headache excepting when she had gone without them.
- Case 130. Mrs. H. R. L., 1889. Headaches and pain in eyes. R. V., 20-20 ; L. V., 20-20. Atropine. R. V., 20-70 ; L. V., 20-70. Hypermetropia. Correcting glasses for reading only. Relieved.
- Case 131. Mr. R. E. W., 1889. Sick-headaches from time to time. Asthenopia. R. V., 20-20 ; L. V., 20-20. Hypermetropic astigmatism. Esoph. 2 in accom. 1 ; abduc. 8 ; adduc. 18. Prism exercises until adduc. 37, then prescribed correcting glasses for reading. Exoph. 5° still uncorrected. Relieved.
- Case 132. Miss B. B. W. Headache nearly constant, pains located in temples and through the eyes. Anæmic ; easily put out of breath. R. V., 20-30 ; L. V., 20-40. Atropine, R. V., 20-20 ; L. V., 20-20. Comp. myopic astigmatism of low degree. Esophoria 9 ; in accom. 6 ; abduc. 6 ; adduc. 36. Correcting glasses and Blaud's iron. Relieved by the iron. Four months later—Sept. 1889—headache returning ; esoph. 4 ; in accom. 2 ; abduc. 7 ; adduc. 20. Anæmia is becoming more marked again ; Blaud's iron again prescribed ; relieved again. Relapsed in Nov. and is now under treatment for relief of esophoria.
- Case 133. Dr. G., 1889. For many years has suffered with severe congestive headaches, and right complete hemianopsia from time to time. Nothing has prevented the recurrence of the attacks, which are steadily becoming more frequent and of longer duration. R. V., 20-20 ; L. V., 20-20. Hypermetropia and presbyopia ; exophoria 4 ; in accom. 8 ; abduc. 4-5 ; adduc. 40. Manifest hypermetropia corrected by specs, for constant use. Presbyopia corrected. During 8 months of use of specs, has had 2 or 3 of his congestive headaches. Marked improvement.
- Case 134. Cuthbert S., 1889—Feb. 18. 7 years old ; complains of constant headache and double vision ; very irritable and difficult to manage ; his disposition seems to have changed of late ; was recently ill with measles.



- R. V., 20-30 ; L. V., 20-20. Hypermetropia. Complains of diplopia, which I could not correct, and suspecting fraud, finally succeeded in proving that he did not really see double. Atropine used, with ophthalmoscope ; found H. 2 D. Ordered S. - 1. 50 for each eye, for constant use ; no medicine. March 25, 1889—Mother brings him again to-day ; he does not complain of headache ; disposition is now good ; he is not nervous or irritable, in short, he is sound again.
- Case 135. Mrs. J. B., 1888. Chronic headache and confused feeling in head. R. V., 20-70 ; L. V., 20-40. Hypermetropic astigmatism and presbyopia. Correcting glasses for distance and for reading. Relieved.
- Case 136. Mrs. M. F. F., 1889. Has always suffered from headaches ; pain in occipital region, especially after using her eyes ; has had two attacks in which she was nearly unconscious, followed by numbness of left arm ; both attacks began with a severe headache in the occipital region. All of her symptoms have been more marked during the past year. Vertigo and diplopia when tired. R. V., 20-20 ; L. V., 20-20. Hypermetropic astigmatism ; heterophoria adduction especially weak. Correcting glasses to be used for all near work. Relief was partial when she used glasses for reading, sewing, &c., and became complete when she began using the specs constantly.
- Case 137. Mrs. E. E. S., 1889. Headache in right side of head. R. V., 20-100 ; L. V., 20-100. Myopia. Correcting glasses. Unknown.
- Case 138. Mr. A. L. D., 1889. Headaches for 12 to 15 years ; pain located in occipital region, and about right eye ; attacks recur sometimes 3 or 4 times each week, sometimes less frequently. R. V., 20-20 ; L. V., 20-20. Hypermetropic astigmatism. Correcting glasses.
- Case 139. Miss C. D. M., 1889. Headaches and asthenopia. R. V., 20-20 ; L. V., 20-20. Hypermetropic astigmatism ; exoph. 2 ; in accom. 3 ; abduc. 7 ; adduc. 10. Prism for near work ; refused to wear glasses for error of refraction ; electricity for int. recti. Relieved of headaches, but some asthenopia remains after severe use of eyes. Saw her five times only.
- Case 140. Mrs. E. T. J., 1889. Headache and pain in eyes for a number of years ; very nervous. R. V., 20-30 ; L. V., 20-20. R., mixed astigmatism. L., hypermetropic astigmatism ; exoph. 1-2 ; in accom. 1-8 ; R., hyperphoria, 1-2.3 ; abduc. 8-9 ; adduc. 8-17. Correcting glasses. Glasses did not stop the headache. Stevens' operation on right sup. rectus ; immediate result. Hyperphoria 0. Nov. 23, 1889—marked improvement since the operation—Sept. 1889. Is not completely relieved yet, however.
- Case 141. Miss M. D., 1889. Constant headache. R. V., 20-20 ; L. V., 20-30. Hypermetropic astigmatism ; weak adduction and abduction. Correcting glasses and rest. Partial relief may be attributed to the glasses

- Case 142. Mr. W., 1889. Headache and asthenopia. R. V., 20-20; L. V., 20-20. Hypermetropic astigmatism. Correcting glasses. Relieved.
- Case 143. Miss C. B. A., 1889. Headaches. R. V., 20-30; L. V., 20-30. Myopic astigmatism. Correcting glasses. Relieved.
- Case 144. Mrs. W. A. B., 1889. Headaches, compressed feeling in top of head; pain in back of neck; was insane last winter. R. V., 20-50; L. V., 20-50. Hypermetropia manifest. S. 3.00 for each eye. Correcting glasses. Unknown.
- Case 145. Mr. J. B. P., 1889. Sick-headaches, nauseated after reading, and vertigo. R. V., 20-20; L. V., 20-20. Myopic astigmatism. Correcting glasses. Relieved.
- Case 146. Miss L. W., 1889. Frequent headaches, which begin over O. S. R. V., 10-200; L. V., 10-200. Myopia. Correcting glasses. Relieved.
- Case 147. Miss M. M., 1889. Very severe headaches for years; no relief from a variety of treatment; headaches are congestive and occur 2 or 3 times per week; nearly constant dull feeling in head; vertigo while reading; asthenopia. R. V., 20-20; L. V., 20-20. Relieved.
- Case 148. Mrs. E. L. J., 1889. Headaches and pain in back of neck. R. V., 20-20; L. V., 20-20. Conjunctivitis. Would not wear glasses; eye drops and general hygiene for eyes. Unknown.
- Case 149. Mr. A. B., 1889. Headaches and asthenopia; is extremely nervous. R. V., 20-20; L. V., 20-20. Atropine. R. V., 20-70; L. V., 20-70. Hypermetropia. Esophoria, 3-4; abduc 4; adduc. 30. Correcting glasses for constant use. Relieved.
- Case 150. Mrs. W. S. Sick-headaches during past 4 years. R. V., 20-30; L. V., 10-100. Myopic astigmatism. Correcting glasses which for several reasons have not been used as yet, although the case was first seen some 5 months ago. Unknown.

# NINE CASES OF NEURALGIA TREATED FOR THE RELIEF OF EYE--STRAIN.

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Successes.....	6
Partial success . . . . .	1
Failures.....	2
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- Case 1. Mr. J. P., 1835. Has been troubled for years with excruciating attacks of neuralgic pains through eyes and temples, extending backward through his head. Reading causes pain in both eyes and temples; has found some temporary relief in quinine. Hermetropine, R. V., 20--200; L. V., fingers at 20 feet. R., Hypermetropia. L., comp. hypermetropic astigmatism; presbyopia; insufficiency of left int. rectus, and L. E. amblyopic from disuse. Exercise of L. eye in reading with correcting glasses; massage and electricity for left eye; strychnine by stomach. R. S.  $-2.75$ . V., 20--20: L., S.  $-\frac{1}{3}$ , C.  $-\frac{1}{3}$  1.75 at 90. V., 20--30, for constant use, also glasses for reading. Relieved, and has remained well to date.
- Case 2. Mrs. R. R. L., 1885. Nearly constant and very severe neuralgic pains about left eye; eye sensitive to light. R. V., fingers at 2 feet ext. Strabismus for many years. L. V., 20--30. Hypermetropic astigmatism. Correcting glass for left eye; electricity and medicinal treatment. Treatment of eye without result; electricity gave her some relief; medicine had no effect.
- Case 3. Dr. H. C. T., 1888. Frequent attacks of severe supra-orbital neuralgia; obliged to take morphine for the pain; attacks are more frequent after severe mental strain; overworked. R. V., 20--20; L. V., 20--20. Comp. hypermetropic astig. in each eye; orthophoria. Correcting glasses for reading. Relieved.
- Case 4. Mr. W. G. W., 1888. Headache and supra-orbital neuralgia after severe mental labor; asthenopia. R. V., 20--20; L. V., 20--20. R., hypermetropia; L., hypermetropic astig. Correcting glasses. Relieved.
- Case 5. Mrs. K., 1887. Frequent periodical attacks of gastralgia and sick-headache; sometimes pain begins in stomach and extends to head; sometimes it begins in head and extends to stomach; but always before the attack ends, she has pain in stomach and in head. Has received a variety



of medicinal treatment at home and in Albany and Troy. No relief; gives no special symptoms of dyspepsia; sight blurs when she reads. R. V., 20-20; L. V., 20-20. Hypermetropic astigmatism. Correcting glasses for constant use; pepsine, gr v., after each meal—of which she had doubtless taken ounces. 1888—One year later saw her husband. He reported that she had had only 2 attacks since she had received her glasses, and that they were due to leaving off the glasses; the relief is perfect.

Case 6. Mr. H. F. P., 1888. Has frequent attacks of right supra-orbital neuralgia; is frequently nauseated by the pain; has had headache all his life; suffers from obstinate constipation; is in poor health. R. V., 20-20; L. V., 20-20. Hypermetropic astigmatism. Correcting glasses for constant use. Relieved at once; took no medicine to correct his bowels, but speedily recovered from his constipation; great improvement in his general health.

Case 7. Mrs. Dr. S., 1888. Intense neuralgic pain about left eye for two months. R. V. 20-40; L. V., 20-30. Hypermetropic astigmatism. Correcting glasses. Relieved at once.

Case 8. Mr. B. B. S., 1889. Severe neuralgia in his head; uncomfortable feelings about his right eye; is over-worked and very nervous; asthenopia. R. V., 20-50; L. V., 20-30. Myopic astig. and presbyopia. Reading specs. No special effect on neuralgia. Prescribed glasses for his asthenopia. He was under treatment by family physician neuralgia.

Case 9. Mrs. F. E. H., 1889—Feb. 6. Periodical attacks of neuralgic pain in left temple and about left eye; pain lasts 36 hours, and is attended with nausea; obliged to go to bed; at such times photophobia is well marked; medical treatment has given no relief. R. V., 10-200; L. V., 10-200. Atropine, R. V., 10-205; L. V., 10-200. Comp. myopic astigmatism each eye; presbyopia. R., hyperph. 1°; exoph. 5; in accom. 10; abduc. 9; adduc. 10. Correcting glasses; Stevens' op. left ext. rectus, leaving exoph. 2°. Four days later—R., hyperphoria 1; exoph. 1; in accom. 8; abduc. 8; adduc. 18. Feb. 21—Headache and vertigo. Hyperphoria 0; exoph. 1; in accom. 9; phenacetin grs. 4 q. 1 h.; relief by afternoon. March 21—exoph. 3; in accom. 7; abduc. 8; adduc. 24; sensitive points about left supra-orbital nerve; galvanism A. on forehead and temple, mobile; C.; nape of neck, stable; also exercise of ocular muscles. April 8—Exoph. in accom. 1-2; abduc. 8; adduc. 49. Discharged much improved; still has attacks of neuralgia, but they are much less frequent, and less severe.

NOTE.—December 13, '89.—Saw patient again. Improvement continues, but is not entirely well: has been compelled to use her eyes excessively. Esop. 1-2. Abd. 6; add. 30. December 27. L., Hyper. 2. Exoph. 3 in accom. 5; abd. 7; add. 36. January 7, 1890. One week ago had a very severe attack of pain and nausea: first attack for six weeks—induced by over exertion. January 9—L., Hyp. 2. Stevens' op. on left sup. rectus, leaving hyperph. 0. January 11—L., Hyper. ½; Esoph. 1; abd. 8.











